Feb. 1, 1944. C. F. DINLEY 2,340,456

ATTRITION MILL

Filed Sept. 27, 1941

FIG. 1.

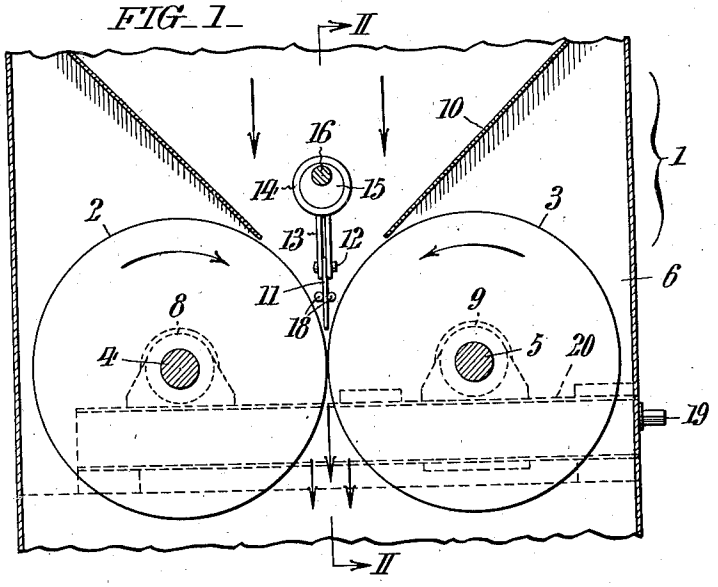
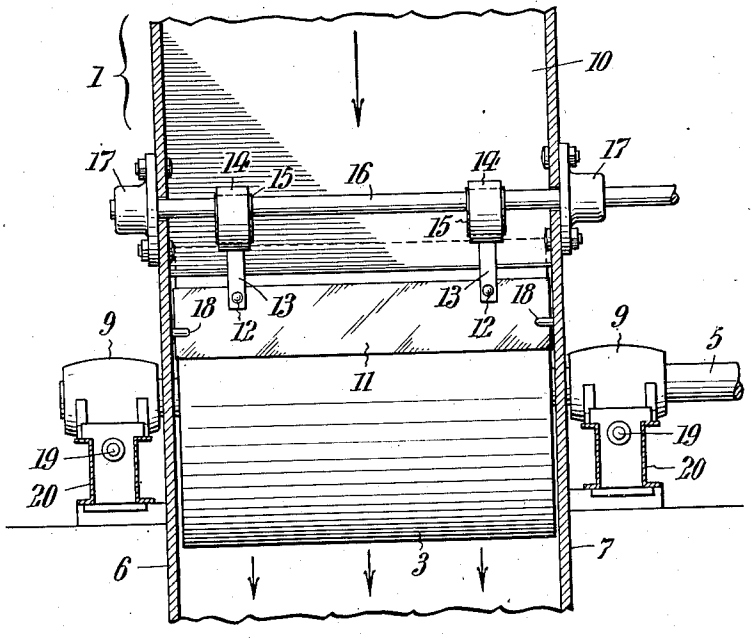


FIG. 2.



WITNESSES:

Hubert Fuchs

Thomas W. Kerr, Jr.

INVENTOR:

Clarence F. Dinley,

BY Paul & Paul

ATTORNEYS.

Patented Feb. 1, 1944 2,340,456

UNITED STATES PATENT OFFICE

2,340,456

ATTRITION MILL

Clarence F. Dinley, Detroit, Mich., assignor to Detroit Rex Products Company, Detroit, Mich., a corporation of Michigan

Application September 27, 1941, Serial No. 412,549

2 Claims. (Cl. 83—12)

This invention relates to attrition mills of a type used to crush or flake vegetable matter or to divide or break down other materials for subsequent processing. In such mills, as ordinarily constructed, the material is passed between a pair of juxtaposed oppositely driven horizontal axis rollers by which the crushing or flaking is effected, said rollers being usually deeply fluted or coarsely roughened. The action of roughened rollers upon certain materials or products, like soya beans for example to prepare them for extraction of the oil from them, is ordinarily too harsh or severe. Smooth or substantially smooth surfaced rollers on the other hand unless they be of unduly large diameters to provide a deep and acute entrant bight, will not satisfactorily advance oily or slippery materials. Such large diameter rollers are however objectionable not only from the standpoint of their high cost, but also because they add to the size of the mill and require considerable power to drive them.

My invention is directed toward overcoming the above drawbacks, that is to say, I aim to enable the use in mills of the kind referred to, smooth or substantially smooth surfaced crushing rollers of relatively small diameters and at the same time insure passage of the material between them. This objective I attain in practice as hereinafter more fully disclosed, through provision of simple and inexpensive auxiliary means by which the material is constantly packed into the entrant bight of the rollers and thereby caused to be effectively gripped between the latter and carried through the mill without excessive working.

In the drawing, Fig. 1 is a fragmentary view in longitudinal section of an attrition mill conveniently embodying my invention; and

Fig. 2 is a cross-section taken as indicated by the angled arrows II—II in Fig. 1.

As herein delineated, my improved mill comprises a housing 1 which encloses a pair of juxtapositioned horizontal axis squeeze rollers 2 and 3 of relatively small diameter, which are smooth surfaced or substantially so, that is to say, provided with fine, closely-spaced longitudinally-extending line cuts on their cylindric surfaces. By suitable means (not illustrated) the rollers 2 and 3 are oppositely driven as indicated by the arrows in Fig. 1 so that their surfaces move toward each other at the upper or receiving bight between them. The shafts 4 and 5 of the rollers 2 and 3 extend through the side walls 6 and 7 of the housing and are journaled at opposite ends in externally-located bearings 8 and 9. Within the top of the housing 1 is a hopper 10 for the material which is to be crushed, whereof the sides are complementarily sloped inwardly as shown to direct the material into the receiving bight of the rollers 2 and 3.

For the purpose of insuring passage of the material downwardly between the rollers 2 and 3, I have provided auxiliary means which includes a stuffing or packing member in the form of a relatively-thin vertically-arranged oblong plate 11 suspended substantially in the central vertical plane between the said rollers. As shown in Fig. 2, the packing plate 11 extends across the width of the hopper 10 and is connected by bolts 12 to the lower ends of arms 13 pendent from the straps 14 of a pair of eccentrics 15 which are affixed in spaced relation to a centrally located cross shaft 16 higher up in said hopper. The shaft 16 is rotatively supported in bearings 17 bolted to the side walls 6 and 7 of the housing 1, and may be rotated by drive means of any suitable type. At each end, the packing plate 11 is engaged adjacent its bottom edge between a pair of spaced guide studs 18 which project inwardly from the corresponding side walls of the casing 1. By regulatable screw means shown at 19, the bearings 9 may be shifted along guideways 20 to move the roller 3 toward or away from the roller 2 for decrease or increase of the interval between them as may be desired or required.

During the operation of the mill, the plate 11 is constantly reciprocated vertically and by this action effectively packs the gravity-fed material downwardly into the upper bight of the oppositely revolving crushing rollers 2 and 3 and so insures the passage of the material between said rollers in a manner which will be readily understood from Fig. 1. By virtue of its actuation by the eccentrics 15, the plate 11 will be oscillated slightly from side to side about a shifting fulcrum at the guide studs 18 as it is vertically reciprocated within the bight of the rollers 2 and 3, incident to which its bottom edge will be prevented from slapping the rollers 2 and 3. As a consequence of this action, positive downward feeding of the meal between the rollers 2 and 3 is assured.

Having thus described my invention, I claim:

1. An attrition mill for flaking soya beans or the like comprising a pair of substantially smooth-surfaced juxtapositioned crushing rolls with their axes in a horizontal plane; means for continuously rotating the rolls in opposite directions relative to the receiving bight between them; a hopper for directing the beans into the receiving bight of the rolls; a relatively thin vertically-arranged

packing member extending downward into the bight with its lower edge parallel to the latter and disposed slightly above the nip of the rolls; and means for actuating the packing member to cause its lower edge to move vertically and laterally in a closed path within the bight of said rolls.

2. The invention according to claim 1, in which the actuating means includes a rotary shaft in the vertical longitudinal plane through the bight of the rolls above the latter, an eccentric on the shaft with its strap connected to the packing member, and guide means in which the packing member is slidably engaged at a point somewhat above its lower edge.

CLARENCE F. DINLEY.